

PCTWORLD INTELLECTUAL PROPERTY ORGANIZATION
International Bureau

INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification 7 : H04N 5/445		A1	(11) International Publication Number: WO 00/40014
			(43) International Publication Date: 6 July 2000 (06.07.00)
(21) International Application Number: PCT/US99/30632 (22) International Filing Date: 22 December 1999 (22.12.99) (30) Priority Data: 60/114,076 28 December 1998 (28.12.98) US (71) Applicant (for all designated States except US): THOMSON LICENSING S.A. [FR/FR]; 46, Quai A. Le Cedex, F-92648 Boulogne Cedex (FR). (72) Inventors; and (75) Inventors/Applicants (for US only): STUART, Anthony, Edward [US/US]; 3162 Normandy Road, Indianapolis, IN 46222-1375 (US). MORRISON, Hugh, Boyd [US/US]; 7454 Galloway Avenue, Indianapolis, IN 46250-2500 (US). (74) Agents: TRIPOLI, Joseph, S. et al.; Thomson Multimedia Licensing Incorporated, P.O. Box 5312, Princeton, NJ 08543-5312 (US).		(81) Designated States: AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CR, CU, CZ, DE, DK, DM, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG). Published With international search report.	

(54) Title: METHOD FOR OPERATING A VIDEO PROCESSING APPARATUS VIA AN ELECTRONIC MAIL MESSAGE

500

	TONIGHT AT 7PM CLICK HERE TO TUNE/SETUP RECORD				
	ANTHONY	GO BACK	SAVE	DELETE	FORWARD
	GET+SEND	REPLY	REPLY TO ALL	PRINT	SENDER
	READ	FROM: ANTHONY Cc: 502 DATE: 6/12/98, 12:06PM SUBJECT: RECORD 506			
	WRITE				
	ADDRESSES	PASSWORD: NIPPER 206 7PM 7:30PM 6/12/99 SP			
	FOLDERS				
OPTIONS					
VIEW ADS	PRESS ENTER TO GO BACK TO THE PREVIOUS SCREEN				

508

(57) Abstract

A video processing apparatus receives an electronic message comprising control information, via the Internet from a device interconnected thereto. The message includes control information, which is used by the video processing apparatus to control an operating mode thereof. The control information may include both time and channel data as well as a recording command for programming a timer. The message may contain a password, which is used to verify the authenticity of the message. Alternately, the control information may only include program data, which is passed to the electronic program guide to determine the time and channel information associated with the program data.

FOR THE PURPOSES OF INFORMATION ONLY

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AL	Albania	ES	Spain	LS	Lesotho	SI	Slovenia
AM	Armenia	FI	Finland	LT	Lithuania	SK	Slovakia
AT	Austria	FR	France	LU	Luxembourg	SN	Senegal
AU	Australia	GA	Gabon	LV	Latvia	SZ	Swaziland
AZ	Azerbaijan	GB	United Kingdom	MC	Monaco	TD	Chad
BA	Bosnia and Herzegovina	GE	Georgia	MD	Republic of Moldova	TG	Togo
BB	Barbados	GH	Ghana	MG	Madagascar	TJ	Tajikistan
BE	Belgium	GN	Guinea	MK	The former Yugoslav Republic of Macedonia	TM	Turkmenistan
BF	Burkina Faso	GR	Greece			TR	Turkey
BG	Bulgaria	HU	Hungary	ML	Mali	TT	Trinidad and Tobago
BJ	Benin	IE	Ireland	MN	Mongolia	UA	Ukraine
BR	Brazil	IL	Israel	MR	Mauritania	UG	Uganda
BY	Belarus	IS	Iceland	MW	Malawi	US	United States of America
CA	Canada	IT	Italy	MX	Mexico	UZ	Uzbekistan
CF	Central African Republic	JP	Japan	NE	Niger	VN	Viet Nam
CG	Congo	KE	Kenya	NL	Netherlands	YU	Yugoslavia
CH	Switzerland	KG	Kyrgyzstan	NO	Norway	ZW	Zimbabwe
CI	Côte d'Ivoire	KP	Democratic People's Republic of Korea	NZ	New Zealand		
CM	Cameroon			PL	Poland		
CN	China	KR	Republic of Korea	PT	Portugal		
CU	Cuba	KZ	Kazakhstan	RO	Romania		
CZ	Czech Republic	LC	Saint Lucia	RU	Russian Federation		
DE	Germany	LI	Liechtenstein	SD	Sudan		
DK	Denmark	LK	Sri Lanka	SE	Sweden		
EE	Estonia	LR	Liberia	SG	Singapore		

METHOD FOR OPERATING A VIDEO PROCESSING APPARATUS VIA AN ELECTRONIC MAIL MESSAGE

FIELD OF INVENTION

5 This invention generally relates to a method for operating a video processing apparatus using an electronic mail message for providing control information.

BACKGROUND OF INVENTION

10 Electronic Program Guides (EPGs) allow viewers to select any channel at any time during some period into the future, e.g., up to seven days forward. Once a particular program is selected, for example, by highlighting, the viewer can perform functions pertaining to that selected program. For instance, the viewer could instantly switch to that program if it is currently being aired.

15 Viewers could also program one touch video cassette recording (VCR) or the like if the television is properly configured and connected to a recording device.

 Although electronic program guides provide a convenient control interface, the use of EPGs is limited to situations where a user is present to view and interact with the EPG. There is consequently a need in the art for a

20 convenient way to permit operation of a video processing apparatus remotely using an electronic mail message to provide the control information that is necessary for operating the apparatus.

SUMMARY OF THE INVENTION

25 The present invention resides, in part, in recognition of the described problem and, in part, in providing a solution to the problem. The present invention provides a convenient way of incorporating into an electronic message, control information that may be used to operate a video processing apparatus, such as a television receiver, a video recording device (e.g., VCR), a satellite receiver,

30 digital video disk (DVD), a set-top box or the like. The present invention links the traditional functions of a video processing apparatus with those of a personal computer, particularly, electronic communication via the Internet to achieve the solution. Employing this invention with an intranet, local network, or the like is within the scope of the present invention.

Generally, the present invention defines a method for operating a video processing apparatus. The method comprises receiving an electronic mail message via the Internet from a device interconnected thereto, said message comprising control information; processing, in said video processing apparatus, said message to determine said control information; and operating said video processing apparatus in response to said control information.

In accordance with one aspect of the present invention, in response to verifying a password contained in the message, the video processing apparatus is turned on at the desired time and a program is selected in response to said time and channel data.

In accordance with another aspect of the present invention, the control information comprises a recording command that controls a videorecording device, interconnected thereto, to record a program associated with time and channel data. Particularly, the step of controlling comprises programming an event timer, associated with said video recording device, using said time and channel data.

In accordance with yet another aspect of the present invention, control information comprises a recording command and program data. The program data is passed to the electronic program guide to determine the time and channel information associated with the program data.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 shows an example of a television system in accordance with the present invention;

Fig. 2 shows an example of a digital video processing apparatus in accordance with the present invention;

Fig. 3 is a software flow chart in accordance with the present invention;

Fig. 4 shows an EPG menu according to an embodiment of the present invention; and

Fig. 5 shows an electronic message according to an implementation of the present invention.

DETAILED DESCRIPTION

The television receiver shown in Fig. 1 is capable of processing both analog NTSC television signals and Internet information. Descriptions of the remaining well-known functions of the television receiver shown in Figure 1 are not provided except where necessary for understanding the present invention. Tuner 1105 and IF processor 1130 operate in a conventional manner for tuning and demodulating a particular television signal that is included in signal RF_IN. The system shown in FIG. 1 also includes a main microprocessor 1110 for controlling components of the television receiver such as tuner 1105, picture-in-picture processing unit 1140, video signal processor 1155, and Gemstar® data processing module 1160.

Main microprocessor 1110 also controls the operation of a communications interface unit 1113 for providing the capability to upload and download information to and from the Internet. Communication interface unit 1113 includes, for example, a modem for connecting to an Internet service provider, e.g., via a telephone line or via a cable television line. The communication capability allows the system shown in Figure 1 to provide electronic message capability and Internet related features such as web browsing in addition to receiving television programming. CPU 1112 controls functions included within microprocessor 1110, for example, auxiliary data processor 1115 and on-screen display (OSD) processor 1117. Auxiliary data processor 1115 extracts auxiliary data such as Gemstar® data from video signal PIPV.

Gemstar® data, which provides program guide data (e.g., EPG) information in a known format, is typically received only on a particular television channel and the television receiver must tune that channel to extract Gemstar® data usually during a time period when the television receiver is typically not in use (e.g., 2:00 AM). At that time, CPU 1112 configures decoder 1115 such that auxiliary data is extracted from horizontal line intervals such as line 16 that are used for Gemstar® data. For an EPG display, the display data included in the EPG display is produced by OSD processor 1117 and included in the output signal by VSP 1155 in response to fast switch signal FSW.

An exemplary embodiment of the features of the system shown in FIG. 1 that have been described thus far comprises an ST9296 microprocessor produced by SGS-Thomson Microelectronics; an M65616 picture-in-picture

processor produced by Mitsubishi; and an LA7612 video signal processor produced by Sanyo.

Figure 2 is an MPEG compatible system for receiving MPEG encoded transport streams representing broadcast programs and is also capable of processing Internet information, including electronic messages. User interface systems are also applicable to other types of digital signal processing devices including non-MPEG compatible systems, involving other types of encoded datastreams (e.g., digital video disc (DVD) systems). The exemplary system described below is described as processing broadcast programs. The term 'program' is used to represent any form of packetized data such as telephone messages, computer programs, Internet data, audio presentations (e.g., from a remote source or from a local source), visual presentations, audiovisual presentations (e.g., from a remote source or a local source), or other communications. Descriptions of the remaining well-known functions of the television receiver shown in Figure 2 are not provided except where necessary for understanding the present invention.

A carrier modulated with video data is received by antenna 10 and processed by input processor unit 15. The resultant digital output signal is demodulated by demodulator 20 and decoded by decoder 30. The output from decoder 30 is processed by transport system 25, which provides compressed data outputs for storage, further decoding, or communication to other devices. Video and audio decoders 85 and 80 respectively, decode the compressed data from system 25 to provide outputs for display.

The data provided to mux 37 from selector 35 is in the form of an MPEG compliant packetized transport datastream as defined in MPEG systems standard section 2.4 and includes program guide information and the data content of one or more program channels. Packet Identifiers (PIDs) identify the individual packets that comprise particular program channels. The transport stream contains Program Specific Information (PSI) for use in identifying the PIDs and assembling individual data packets to recover the content of all the program channels that comprise the packetized datastream. Transport system 25, under the control of the system controller 115, acquires and collates program guide information from the input transport stream, storage device 90 or an Internet service provider via the communication interface unit 116. The individual packets that comprise either particular program channel content or Program Guide

information, are identified by their Packet Identifiers (PIDs) contained within header information

The user interface incorporated in the video receiver shown in Figure 2 enables a user to activate various features by selecting a desired feature from an on-screen display (OSD) menu, for example, an electronic program guide (EPG).

Packets received by decoder 55 from units 45 and 50 that contain program content including audio, video, caption, and other information, are directed by unit 65 from decoder 55 to the designated application device buffers in packet buffer 60. Application control unit 70 sequentially retrieves the audio, video, caption and other data from the designated buffers in buffer 60 and provides the data to audio and video decoders 80 and 85 and high speed data port 75.

In addition, controller 115 is coupled to a communication interface unit 116 that operates in a manner similar to interface unit 1113 of Figure 1. That is, unit 116 provides the capability to upload and download information to and from the Internet. Communication interface unit 116 includes, for example, a modem for connecting to an Internet service provider, e.g., via a telephone line or via a cable television line. The communication capability allows the system shown in Figure 2 to provide electronic message capability and Internet related features such as web browsing in addition to receiving television programming.

Fig. 3 is a software flow chart of an exemplary program which, according to the present invention, may be executed by controller 1110 of Fig. 1, controller 115 of Fig. 2, or any other suitably programmed control arrangement of an electronic host device. The term "electronic host device" as used herein is not limited to television receivers, video recording devices, digital video disks, or set-top boxes, but rather encompasses hybrids thereof (e.g., PCTVs), satellite television and/or data signal converters, program guide receiver units, and the like, regardless of whether incorporated into a television receiver or personal computer or connected externally thereto.

The exemplary program 300, when executed, facilitates processing of received electronic messages, as well as electronic linking of electronic messages to programming information. The exemplary program will be described below only with respect to the exemplary hardware implementation of an electronic host device shown in Fig. 1.

According to the exemplary program, the microprocessor 1110 initially executes program 300 in response to receiving an electronic message 302. Optional Steps 304 and 306 check for a proper password contained in or associated with the message and if not proper then microprocessor 1110 initiates the generation of an appropriate reply message. A determination of whether the electronic message pertains to setting up a future recording event or initiating an automatic turn-on of the device at a defined time is performed in Step 308. An appropriate timer in the "record" or "power-on" schedulers is initialized during Steps 310 and 312. At Step 314, the electronic message is checked to determine whether channel and time information is provided. If provided, the appropriate scheduler is programmed and a reply message is forwarded to the sender in Steps 316 and 318.

If the electronic message does not include channel and time information, then the message is searched, in Step 320, to determine whether any program information, such as, program name, is provided. If such information is not provided then microprocessor 1110 initiates the generation of an appropriate reply message in Step 322. If program information is provided, microprocessor 1110 initiates a search of the electronic program guide in Step 324 to determine all programs satisfying the criteria (program information). If a program is not located that satisfies the search criteria then an appropriate message is forwarded to the user at Step 322. If a program is located during Step 324, then the corresponding channel and time information is programmed into the appropriate scheduler in Step 316 and similarly, the user is notified in Step 318.

In accordance with the present invention, a user sends an electronic message to his/her video processing apparatus (e.g., television receiver). The electronic message encompasses traditional electronic mail (E-mail) messages, electronic instant messages (such as those available for AOL[®] users). Additionally, this invention may encompass the use of telephony in conjunction with a caller-ID function as the vehicle for the message. The electronic message comprises control information for operating the video processing apparatus. The address of the television may be, for example, TV@RCA.com. The user assigns a unique password to the television, which can be used to verify the origin of the message. That is, to prevent the accidental control of another's television.

Now, by sending an electronic message to the television, a user can remotely control the television. For example, via an electronic message sent perhaps from the office, the user can "program" the television to turn-on and select a certain program at a desired time. That way, a user can program his television to turn-on and select the evening news at six o'clock so that upon entering his home the news will be on. Another example would be to permit a user to set up a recording event from a remote location. For example, if the user forgot to program his VCR prior to leaving his home then by sending an electronic message the user can set up the desired recording.

Such a recording may be achieved by either directly programming a timer in a recording device or by setting-up a "one-touch" recording in a television receiver. If the message is sent directly to a recording device, the message should include the necessary time and channel information that is required to program a timer. If the message is sent to the television receiver, or any other video processing apparatus that is capable of receiving and processing an electronic program guide, then the message may only contain program information, for example, the name of the program. In such a situation, the electronic program guide may be searched for a program that satisfies the criteria (i.e., the program information). The necessary time and channel information can be determined via the electronic program guide.

Requesting a recording may create a conflict with a pre-existing programmed event in a video recording apparatus. In such a situation, the latest event could take priority or a return message could be sent to the user advising of the conflict and providing the user an opportunity to resolve the conflict. The conflict could be resolved, perhaps, by overriding the pre-existing programmed event or by canceling the requested recording

The context of the message may include a password, channel number, start and stop times, date and tape speed. Using a consistent subject header, for example "RECORD", the video processing apparatus could determine whether a particular incoming electronic message contained control information. In addition, use of any consistent structure for the message, for example, a specific field which includes the word "RECORDING", could be utilized. Further, a dedicated web-site may be utilized to assist the user in constructing a proper message. An advantage of a dedicated web-site would be the ability to send a secure (i.e., encrypted) electronic message. This would remove the possibility of

accidentally programming someone else's video processing apparatus. Further, a password may be used to verify that the message is from the user. That is, to avoid the possibility of responding to a message from someone not authorized.

A typical EPG menu 400 is shown in Figure 4. The menu 400
5 includes a "grid guide" 400A which, shows a program schedule in a time-and-channel format, similar to a TV schedule listed in a newspaper. In the menu 400, each of the program identifiers (e.g., channel numbers 410-416, channel station names 420-426, web-site identifier 470, Internet identifier 450, electronic message identifier 460, and the like) is selectable by a user to implement respective ones of
10 the programs. When the selected program identifier is associated with an audio program, video program, or audiovisual program, the controller 1110 responds by tuning the electronic host device or an associated receiver to the appropriate channel and by displaying and/or audibly broadcasting that program.

15 An electronic message display 500 is shown in Figure 5. The electronic message display 500 includes at least the following information: SENDER 502, SUBJECT 506 (for identifying the type of message, i.e., RECORD), and a message portion 508. As described above, the message portion 508 may contain the time and channel information of a specific program or
20 may contain program information.

The program information may merely be the name of the program or may include more detailed information, for example, program start time, program end time, program duration; the channel via which the program is transmitted, and characteristic information, and combinations thereof. Examples
25 of the characteristic information include program title, program theme, program category, program keywords, a program description, program type (e.g. audio, video, audiovisual, computer, Internet, and the like), and program repeat frequency (e.g., once per week, daily, etc.).

Controller 1110, in the exemplary embodiment of Figure 1, receives
30 the electronic message via communication interface 1113 from the Internet. Preferably, this message includes enough information about the program of interest that the intended action can be carried out.

The electronic message receiver and/or program-implementing device (e.g., a device of the type shown in Figures 1 and 2) responds to the
35 received message by automatically tuning to that program if it is currently being

aired, automatically tuning to the program in the future if it has yet to be aired and is scheduled for broadcast at a later time (e.g., by setting an appropriate timer or the like), or automatically recording of the program.

As demonstrated above, the interface of the present invention is particularly well suited for use in connection with an electronic program guide (EPG). The electronic program guide (EPG) in this regard may constitute all or a portion of the menu 400.

Preferably, the television-encompassing version of the host device shown in Figure 1 is associated with a recording device (not shown) and the selector is actuatable to effect recording of the television program when the electronic message indicates that the user requests a recording.

While the present invention finds much usefulness in the realm of electronic host devices, which are connected to or defined by a television set, the present invention is not limited to such electronic host devices. The present invention may be implemented, for example, with a computer as the electronic host device. It is to be understood that the embodiments and variations shown and described herein are for illustrations only and that those skilled in the art may implement various modifications without departing from the scope and spirit of the invention.

CLAIMS

1. A method for operating a video processing apparatus comprising the steps of:

- receiving an electronic message via the Internet from a device
5 interconnected thereto, said message comprising control information;
processing, in said video processing apparatus, said message to determine said control information; and
operating said video processing apparatus in response to said control information.

10

2. The method of Claim 1 wherein said control information comprises at least a password, channel data and time data.

3. The method of Claim 2 further comprising the step of evaluating said
15 password for user verification and wherein said step of operating comprises turning on said video processing apparatus at the desired time and selecting a program in response to said time and channel data.

4. The method of Claim 1 wherein said electronic message comprises one
20 of an electronic mail message and an electronic instant message.

5. The method of Claim 2 wherein said control information further comprises a recording command and said step of operating comprises controlling a video recording device, interconnected thereto, to record a program associated with
25 said time and channel data.

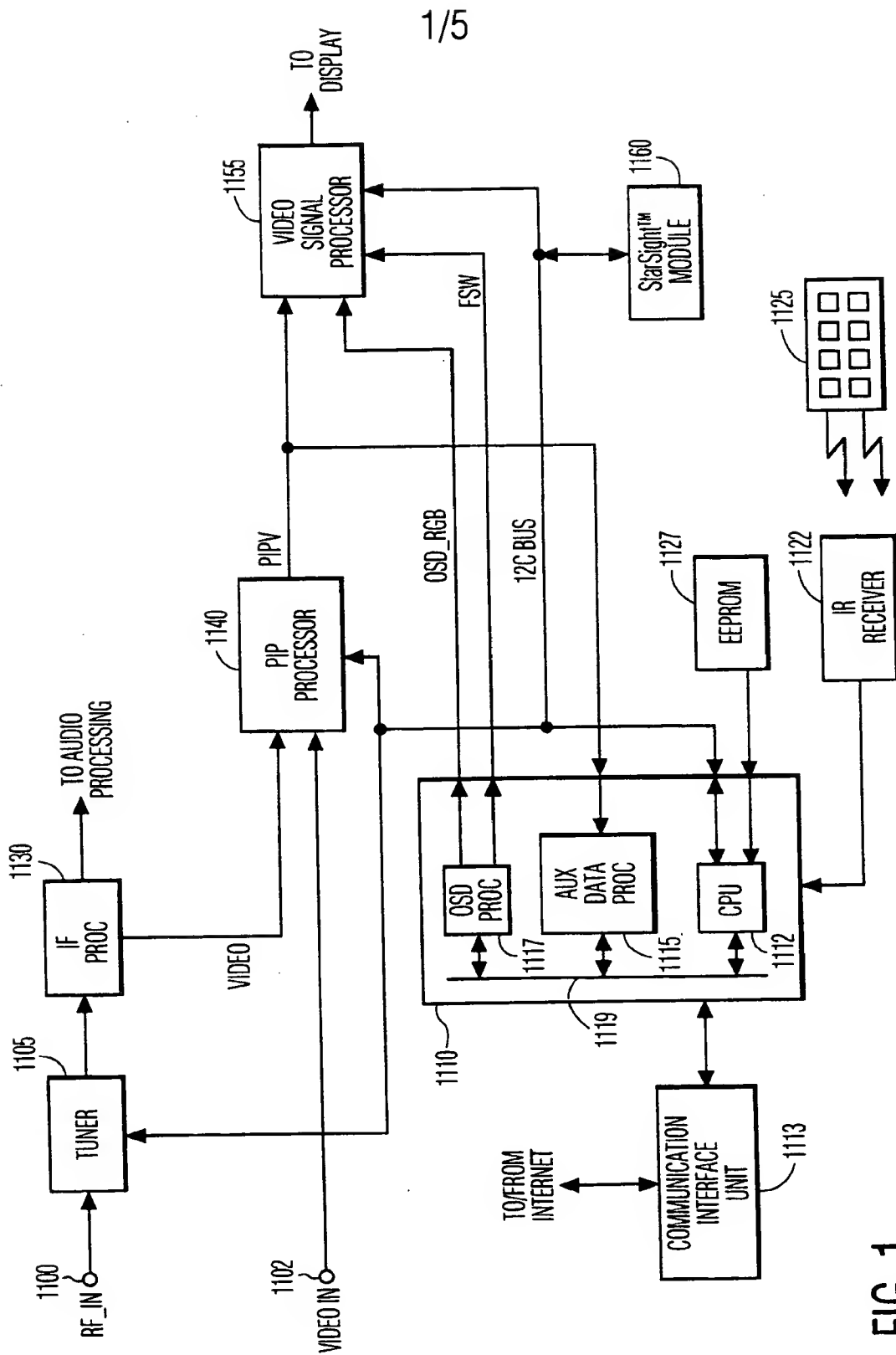
6. The method of Claim 5 wherein said step of controlling comprises programming an event timer, associated with said video recording device, using said time and channel data.

30

7. The method of Claim 6 further comprising forwarding a message indicating the existence of a conflict exists between said time and channel data and a preexisting timer event.

8. The method of Claim 2 wherein said control information comprises program data.

5 9. The method of Claim 8 further comprising passing said program data to the electronic program guide to determine the time and channel information associated with said program data, said program data corresponding to a program listed in said electronic program guide.



2/5

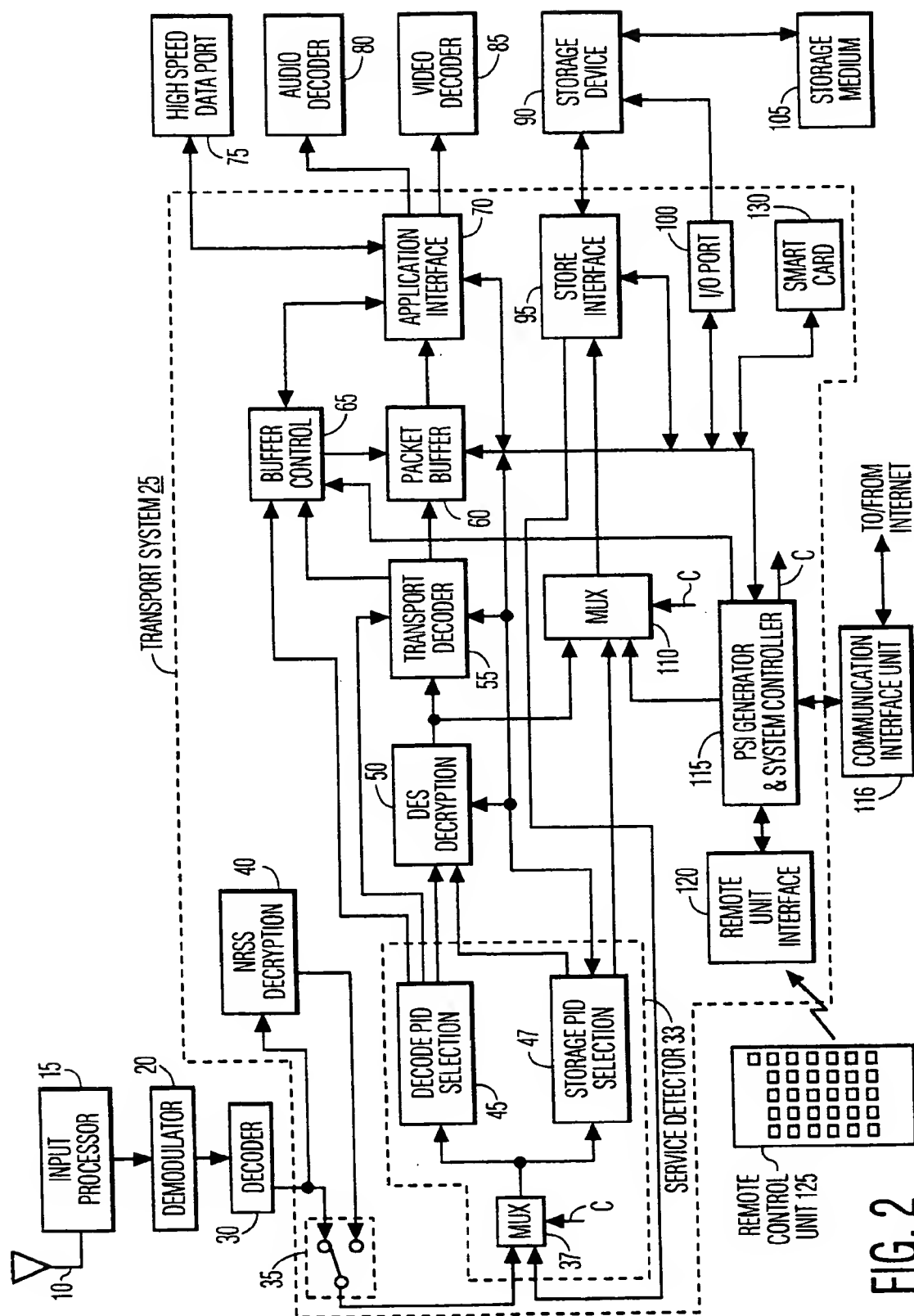


FIG. 2

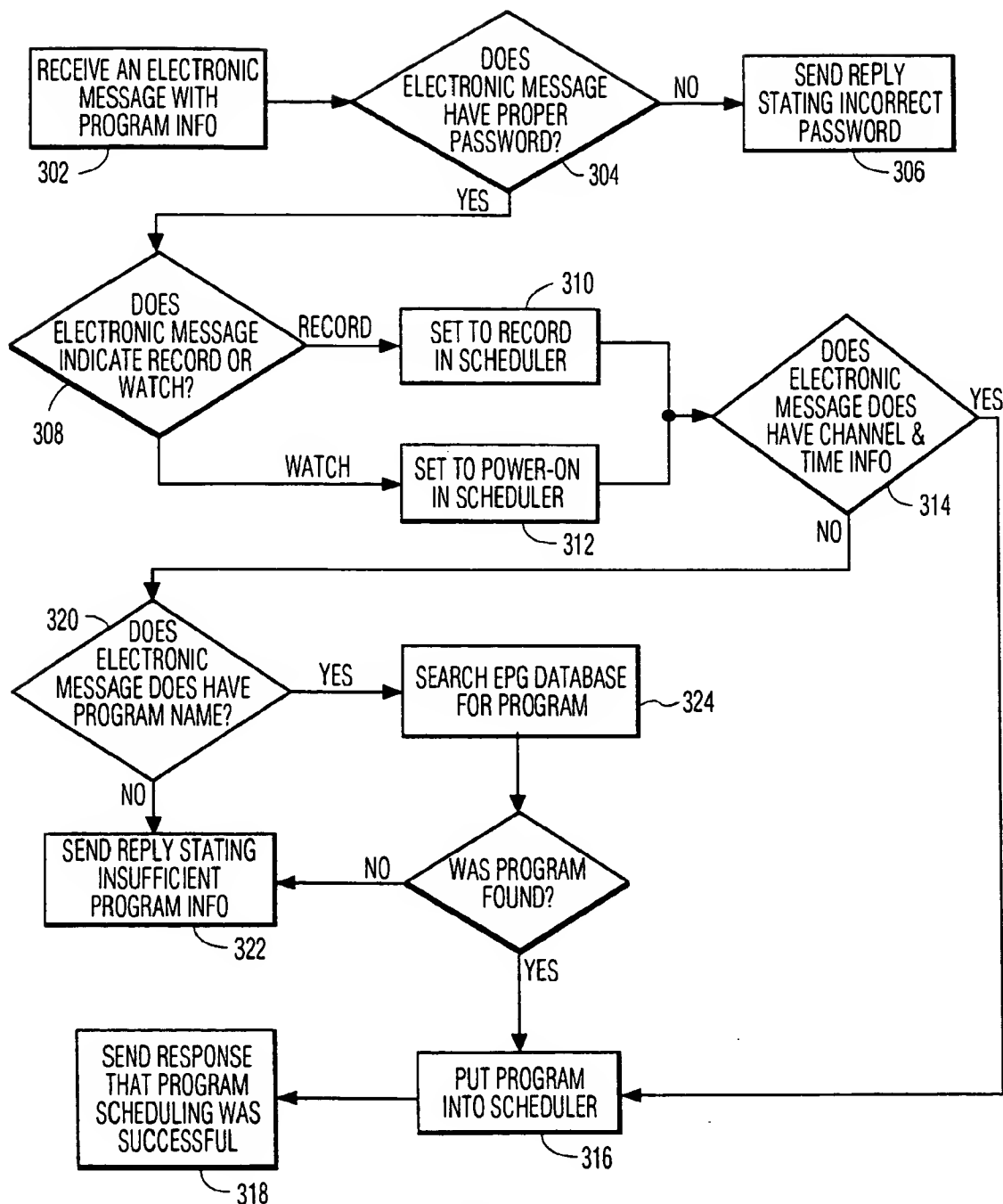


FIG. 3

4/5

PROGRAM GUIDE		TUESDAY 7/22/97 FAMILY		5:09PM		
INSIDE WORLD POLITICS		5:00PM		5:30PM		
7/22	5:00PM	5:30PM	6:00PM	6:30PM	INTERNET EMAIL	
202 CNN	WORLDVIEW		MONEYLINE	CROSSFIRE	400A	
206 ESPN	UP CLOSE	SPORTSCENTER	ESPN.COM	UP CLOSE		
213 HSN	GARDEN...	HOME FU...	BUYER'S M...	SHOWCASE		
253 USA	RENEGADE		WINGS	WINGS		
275 CNBC	BUSINESS...	BUSINESS...	MONEY CL...	INSIDE W...		
910 HBO	APOLLO 13			HOLLYWOOD...		
966 MTV	SINGLED OUT	TOP 10 VIDEO	COUNTDOWN	BEAVIS & ...		
410	411	412	413	414		415
420	421	422	423	424		425
426						

400

430

450

460


EXIT

?

FIG. 4

5/5

500

POSTEX RUNNER	<div style="text-align: center;">  <p>Just Shoot Me! TONIGHT AT 7PM</p> <p>CLICK HERE TO TUNE/SETUP RECORD</p> </div>			
ANTHONY	GO BACK	SAVE	DELETE	FORWARD
GET • SEND	REPLY	REPLY TO ALL	PRINT	SENDER
READ	<p>FROM: ANTHONY 502</p> <p>Cc:</p> <p>DATE: 6/12/98, 12:06PM</p> <p>SUBJECT: RECORD 506</p>			
WRITE	<p>PASSWORD: NIPPER</p> <p>206</p> <p>7PM</p> <p>7:30PM</p> <p>6/12/99</p> <p>SP</p>			
ADDRESSES	<p>PRESS ENTER TO GO BACK TO THE PREVIOUS SCREEN</p>			
FOLDERS				
OPTIONS				
VIEW ADS				

508

FIG. 5

INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 99/30632

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 H04N5/445

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 H04N

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 98 10589 A (STARSIGHT TELECAST INC) 12 March 1998 (1998-03-12)	1
Y	page 16, line 11 -page 18, line 29	2, 4-6, 8, 9
Y	US 5 585 866 A (DARATA PAUL ET AL) 17 December 1996 (1996-12-17) column 7, line 48 -column 36, line 57	2, 5, 6, 8, 9
Y	EP 0 793 387 A (TOKYO SHIBAURA ELECTRIC CO) 3 September 1997 (1997-09-03) column 10, line 3 -column 31, line 25	4
A	WO 98 26584 A (PREVUE INTERNATIONAL INC) 18 June 1998 (1998-06-18) page 8, line 10 -page 43	1-9



Further documents are listed in the continuation of box C.



Patent family members are listed in annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search

10 April 2000

Date of mailing of the international search report

17/04/2000

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl.
Fax: (+31-70) 340-3016

Authorized officer

Materne, A

INTERNATIONAL SEARCH REPORT

Information on patent family members

Inter. Appl. No.

PCT/US 99/30632

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
WO 9810589	A	12-03-1998	AU 4175797 A	26-03-1998
US 5585866	A	17-12-1996	US 5781246 A	14-07-1998
			AU 705839 B	03-06-1999
			AU 6092996 A	30-12-1996
			BR 9608903 A	21-09-1999
			CA 2223018 A	19-12-1996
			EP 0830787 A	25-03-1998
			PL 323830 A	27-04-1998
			WO 9641477 A	19-12-1996
			US 5589892 A	31-12-1996
			US 5822123 A	13-10-1998
			US 6014184 A	11-01-2000
EP 0793387	A	03-09-1997	JP 9237234 A	09-09-1997
			US 5931905 A	03-08-1999
WO 9826584	A	18-06-1998	AU 5696898 A	03-07-1998
			EP 0945003 A	29-09-1999
			NO 992703 A	09-08-1999
			PL 334062 A	31-01-2000
			AU 8913098 A	05-04-1999
			WO 9914947 A	25-03-1999